

AMENDMENTS TO THE CLAIMS

1. (currently amended) A ~~[[M]]~~method of cooling an electrolytic cell (1) intended for aluminium production by means of igneous electrolysis, said cell (1) comprising a pot (20) comprising a metal shell (2) having lateral walls (21, 22) and at least one bottom wall (23), said pot (20) being intended to contain an electrolyte bath (13) and a liquid metal pad (12), said method ~~being characterised in that it comprises~~ comprising:
 - producing heat transfer fluid droplets,
 - placing all or part of said droplets in contact with the shell (2), so as to induce ~~the~~ vaporisation of all or part of said droplets.
2. (currently amended) ~~A Cooling~~ method according to claim 1, ~~characterised in that~~ wherein said droplets are placed in contact with the shell (2) by confinement in the vicinity of the shell, by channelling, projection, or a combination ~~of said means~~ thereof.
3. (currently amended) ~~A Cooling~~ method according to claim 1 ~~or 2~~, ~~characterised in that~~ wherein said droplets are placed in contact with a specified surface (107) of the shell (2).
4. (currently amended) ~~A Cooling~~ method according to ~~any of claim~~[[s]] 1 ~~to 3~~, ~~characterised in that~~ wherein the electrolytic cell (1) is also equipped with at least one confinement means (101) to form a confined space (102) in the vicinity of, or in contact with, a specified surface (107) of at least one of the walls (21, 22, 23) of the shell (2), and ~~in that it~~ wherein said method further comprises the production of heat transfer fluid droplets in said space (102), so as to place all or part of said droplets in contact with said surface (107).
5. (currently amended) ~~A Cooling~~ method according to claim 4, ~~characterised in that~~ wherein the confinement means (101) forms a confined space (102) in the vicinity of, or in contact with, a specified surface (107) of at least one of the lateral walls (21, 22) of the shell (2).
6. (currently amended) ~~A Cooling~~ method according to claim 4 ~~or 5~~, ~~characterised in that~~ wherein the confinement means (101) is contiguous or fixed to the shell (2) or integral therewith.

7. (currently amended) ~~A Cooling~~ method according to ~~any of claim[[s]] 1 to 6,~~
~~characterised in that~~ wherein said droplets are produced by spraying said heat transfer fluid.
8. (currently amended) ~~A Cooling~~ method according to claim 7, ~~characterised in that~~
wherein at least one nozzle is used to carry out said spraying.
9. (currently amended) ~~A Cooling~~ method according to ~~any of claim[[s]] 1 to 8,~~
~~characterised in that~~ wherein said heat transfer fluid is water.
10. (currently amended) ~~A Cooling~~ method according to claim 9, ~~characterised in that~~
wherein the water is purified.
11. (currently amended) ~~A Cooling~~ method according to ~~any of claim[[s]] 1 to 10,~~
~~characterised in that~~ wherein said droplets are mixed with a carrier gas.
12. (currently amended) ~~A Cooling~~ method according to claim 11, ~~characterised in that~~ said
carrier gas is used to produce said droplets by spraying.
13. (currently amended) ~~A Cooling~~ method according to claim 11 ~~or 12,~~ ~~characterised in that~~
wherein said carrier gas is air.
14. (currently amended) ~~A Cooling~~ method according to ~~any of claim[[s]] 1 to 13,~~
~~characterised in that it comprises control of~~ further comprising controlling the heat transfer fluid
droplet production rate.
15. (currently amended) ~~A Cooling~~ method according to ~~any of claim[[s]] 1 to 14,~~
~~characterised in that~~ wherein said droplets have a size between 0.1 and 5 mm, ~~and preferentially~~
~~between 1 and 5 mm.~~
16. (currently amended) ~~A Cooling~~ method according to ~~any of claim[[s]] 1 to 15,~~
~~characterised in that~~ wherein the droplets form a mist or aerosol.
17. (currently amended) ~~A Cooling~~ method according to ~~any of claim[[s]] 1 to 16,~~
~~characterised in that~~ wherein the droplets are ~~typically~~ produced at a specified distance D from

~~one of the a~~ walls ~~(21, 22, 23)~~ of the shell (2) less than 20 cm, so as to limit the coalescence of said droplets before ~~their~~ vaporisation in contact with said wall.

18. (currently amended) ~~A Cooling~~ method according to ~~any of~~ claim[[s]] 1 ~~to 17~~, ~~characterised in that~~ wherein the confinement means (101) comprises at least one casing.

19. (currently amended) ~~A Cooling~~ method according to claim 18, ~~characterised in that~~ wherein said casing (101) is positioned so that [[it]] said casing overlaps with [[the]] an average level of [[the]] interface (19) between the electrolyte bath (13) and the liquid metal pad (12).

20. (currently amended) ~~A Cooling~~ method according to ~~any of~~ claim[[s]] 1 ~~to 19~~, ~~characterised in that it also comprises~~ further comprising evacuating all or part of [[the]] heat transfer fluid vapour formed by the vaporisation of all or part of said droplets upon contacting the shell (2).

21. (currently amended) ~~A Cooling~~ method according to claim 20, ~~characterised in that~~ wherein said vapour is evacuated by ~~means of~~ natural ventilation, by suction or blowing, or a combination ~~of said means~~ thereof.

22. (currently amended) ~~A Cooling~~ system (100) of an electrolytic cell (1) intended for aluminium production by means of igneous electrolysis, said cell (1) comprising a pot (20) comprising a metal shell (2) having lateral walls (21, 22) and a bottom wall (23), said pot (20) being intended to contain an electrolyte bath (13) and a liquid metal pad (12), wherein said system ~~being characterised in that it~~ comprises at least one means (103) to produce heat transfer fluid droplets and a means (101) to place all or part of said droplets in contact with the shell (2), so as to induce the vaporisation of all or part of said droplets.

23. (currently amended) ~~A Cooling~~ system (100) according to claim 22, ~~characterised in that~~ ~~it also comprises~~ further comprising:

- at least one confinement casing (101) at a specified distance from at least one ~~of the~~ wall[[s]] (21, 22, 23) of the shell (2),
- heat transfer fluid supply means (105, ~~111, 112, 113, 114~~),

- at least one means (103) to produce heat transfer fluid droplets in said casing, so as to place all or part of said droplets in contact with the shell (2).

24. (currently amended) A Cooling system (100) according to claim 23, ~~characterised in that the or wherein~~ each confinement casing (101) is at a specified distance from at least one of the lateral walls (21, 22) of the shell (2) less than 20 cm.

25. (currently amended) A Cooling system (100) according to claim 23 ~~or 24~~, ~~characterised in that wherein~~ each confinement casing (101) is positioned so as to overlap with ~~[[the]]~~ an average level of ~~[[the]]~~ an interface (19) between the electrolyte bath (13) and the liquid metal pad (12).

26. (currently amended) A Cooling system (100) according to ~~any of claim[[s]] 23 to 25~~, ~~characterised in that it comprises~~ comprising a plurality of confinement casings (101) distributed around the shell (2).

27. (currently amended) A Cooling system (100) according to ~~any of claim[[s]] 23 to 26~~, ~~characterised in that wherein~~ the heat transfer fluid supply means (105, 111, 112, 113, 114) comprise routing means (105, 111, 112, 114) and a treatment column (113).

28. (currently amended) A Cooling system (100) according to ~~any of claim[[s]] 22 to 27~~, ~~characterised in that wherein~~ said means (103) to produce droplets is a spraying means.

29. (currently amended) A Cooling system (100) according to claim 28, ~~characterised in that that wherein the~~ spraying means (103) comprises at least one nozzle.

30. (currently amended) A Cooling system (100) according to claim 29, ~~characterised in that wherein~~ said nozzle is an aerosol nozzle.

31. (currently amended) A Cooling system (100) according to ~~any of claim[[s]] 22 to 30~~, ~~characterised in that it also comprises~~ further comprising at least one means (104, 110) to supply each confinement casing (101) with carrier gas.

32. (currently amended) ~~A Cooling system (100) according to claim 31, characterised in that it also comprises~~ further comprising a means (108) to produce said droplets using said carrier gas.
33. (currently amended) ~~A Cooling system (100) according to any of claim[[s]] 22 to 32, characterised in that it comprises~~ further comprising at least one means (109) to control the production rate of said droplets.
34. (currently amended) ~~A Cooling system (100) according to any of claim[[s]] 22 to 33, characterised in that it comprises~~ further comprising means (106, 120, 121, 122, 123, 124) to evacuate all or part of [[the]] vaporised heat transfer fluid.
35. (currently amended) ~~A Cooling system (100) according to claim 34, characterised in that wherein~~ the evacuation means (106, 120, 121, 122, 123, 124) comprise evacuation conduits (106, 120, 121, 124) and a suction or blowing means (123).
36. (currently amended) ~~A Cooling system (100) according to claim 34 to 35, characterised in that wherein~~ the evacuation means (106, 120, 121, 122, 123, 124) comprise a condenser (122) to condense the suspended heat transfer fluid.
37. (currently amended) ~~Use of the cooling method according to any of claims 1 to 21 to cool~~ A method for cooling an igneous electrolysis aluminium production cell comprising using a method of claim 1.
38. (currently amended) ~~Use of the cooling system according to any of claims 22 to 36 to cool~~ A method for cooling an igneous electrolysis aluminium production cell comprising using a system of claim 22.
39. (currently amended) ~~A [[M]]method to regulate an electrolytic cell intended for aluminium production by means of igneous electrolysis including~~ comprising a method ~~to cool said cell~~ according to ~~any of claim[[s]] 1 to 21.~~

40. (currently amended) An ~~[[E]]~~electrolytic cell intended for aluminium production by means of igneous electrolysis comprising a cooling system according to ~~any of claim~~~~[[s]]~~ 22 to 36.